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Contributions to a Revision of the Genus *Schwiebea* (Acari: Acaridae). II. Redescription of *Schwiebea koerneri*

By Eberhard Wurst and Brigitte Frank, Stuttgart

With 62 figures and 1 table

Summary

All developmental stages of *Schwiebea koerneri* Türk & Türk, 1957 are described by using the original material of the Türk collection (Karlsruhe) and new field collections. Up to now this species was known only from its deutonymph. The redescription presents for the first time all instars as drawings as well as light and electron micrographs. In *S. koerneri*, both homeomorphic and heteromorphic males occur, the latter constituting the most prevalent male type. The heteromorphic males show a considerable variation with respect to their body size and to the relative size and shape of leg III. Instead of the small central papilla common in the Astigmata a short seta originates in the center of each adanal copulatory sucker of *S. koerneri*.

Zusammenfassung

Unter Benutzung des Original-Materials der Türk-Sammlung (Karlsruhe) sowie neuer Aufsammlungen werden alle Entwicklungsstadien von *Schwiebea koerneri* Türk & Türk, 1957 beschrieben. Diese Art war bisher nur als Deutonymphe bekannt. In der Wiederbeschreibung werden alle Stadien in Zeichnungen sowie licht- und elektronenmikroskopisch abgebildet. Bei *S. koerneri* treten sowohl der homöomorphe wie der heteromorphe Männchen-Typ auf, wobei der heteromorphe Typ vorherrschend ist. Die heteromorphen Männchen zeigen eine beträchtliche Variabilität hinsichtlich ihrer Körpergröße wie auch im Hinblick auf die relative Größe und Ausbildung von Bein III. Anstelle der bei astigmaten Milben üblichen Zentralpille befindet sich bei *S. koerneri* im Zentrum jedes adanalen Kopulations-Saugnapfes eine kurze Borste.

Contents

1. Introduction 2
2. Materials, methods and acknowledgements 2
2.1. Materials 2
2.2. Methods 8
2.3. Acknowledgements 9

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Zusammenfassung

Unter Benutzung des Original-Materials der Türk-Sammlung (Karlsruhe) sowie neuer Aufsammlungen werden alle Entwicklungsstadien von *Schwiebea koerneri* Türk & Türk, 1957 beschrieben. Diese Art war bisher nur als Deutonymphe bekannt. In der Wiederbeschreibung werden alle Stadien in Zeichnungen sowie licht- und elektronenmikroskopisch abgebildet. Bei *S. koerneri* treten sowohl der homöomorphe wie der heteromorphe Männchen-Typ auf, wobei der heteromorphe Typ vorherrschend ist. Die heteromorphen Männchen zeigen eine beträchtliche Variabilität hinsichtlich ihrer Körpergröße wie auch im Hinblick auf die relative Größe und Ausbildung von Bein III. Anstelle der bei astigmaten Milben üblichen Zentralpille befindet sich bei *S. koerneri* im Zentrum jedes adanalen Kopulations-Saugnapfes eine kurze Borste.

Contents

1. Introduction 2
2. Materials, methods and acknowledgements 2
2.1. Materials 2
2.2. Methods 8
2.3. Acknowledgements 9

SMITHSONIAN
APR 12 2000
LIBRARIES

3. *Schwiebea koerneri* Türk & Türk, 1957 9
3.1. General aspects 9
3.2. Redescription of *Schwiebea koerneri* Türk & Türk, 1957 11
3.2.1. Adults 11
3.2.2. Tritonymph 26
3.2.3. Deutonymph 27
3.2.4. Protonymph 27
3.2.5. Larva and egg 28
3.3. Habitats of *Schwiebea koerneri* 28
4. References 28

1. Introduction

The mites of the genus *Schwiebea* are free-living saprophages that feed on decaying plant material. Most species occur in and under the bark of rotting wood. Under adequate conditions their populations can reach enormous numbers of individuals making them one of the most prominent groups of edaphic organisms. *Schwiebea* mites normally require substrates of high moisture. However, *Schwiebea* mites facultatively produce deutonymphs that are instars specialized for dispersal and resisting adverse environmental conditions which also enables these mites to bridge periods of reduced humidity. The morphology of the deutonymphs (= hypopi) deviate dramatically from that of the other life stages of the same individual. Thus, the question whether the hypopi belong to a particular life cycle can only be verified by rearing experiments. It was mainly this particular feature in the life cycle of *Schwiebea* mites that resulted in numerous synonymes, because the necessary rearing experiments had not been done prior to the description of new "forms" as new species.

This paper is part of an extended revision of the central European species of the genera *Schwiebea, Michaelopus* and *Thyreophagus* (Wurst & Frank 1998). The main purpose in this work was to obtain complete life cycles for all species and on this basis to eliminate the present taxonomic chaos in these genera.

2. Materials, Methods and Acknowledgements

2.1. Materials

We collected mites from moist, decomposed plant material (fallen leaves, rotten branches and wood from old tree stumps and ants nests) from various localities (see below). The plant material was put into plastic bags and kept moist and cool until examinations. Furthermore, numerous arthropods found at the localities of plant material collections were inspected for deutonymphs.

Localities where mites were taken are the following (all materials were collected by E. Wurst):

Germany – 23. 01. 89. Schwieberdingen (near Ludwigsburg), location "Mühläcker"; in mouldy pulp in a tree hole (only deutonymphs); – 12. 04. 90. Schwieberdingen (near Ludwigsburg), alluvial forest of the River Glems; in tree stump, as deutonymphs on a female *Lithobius forficatus* (Chilopoda: Lithobiidae); – 17. 03. 91. Hillside west of Merklingen (near Weil der Stadt); in tree-trunk, in abandoned nest of *Lasius fuliginosus* (Insecta: Hymenoptera: Formicidae); – 22. 03. 92. Schwieberdingen (near Ludwigsburg), alluvial forest of the River Glems; in wet bark; – 25. 03. 93. Schwieberdingen (near Ludwigsburg); in tree-trunk, in nest of *Lasius fuliginosus*; – 22. 02. 97. Schwieberdingen (near Ludwigsburg); in hollow tree-trunk; –

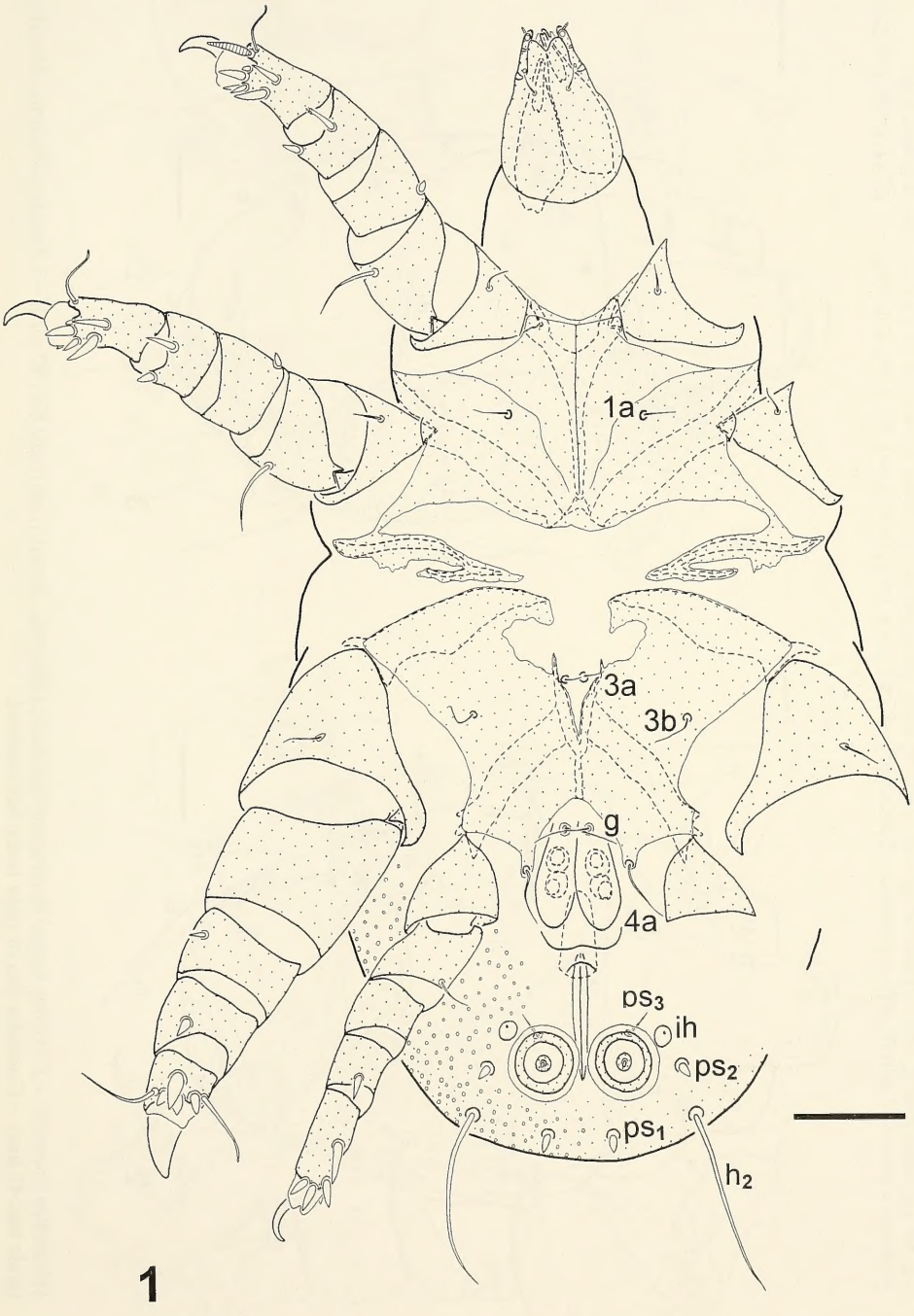
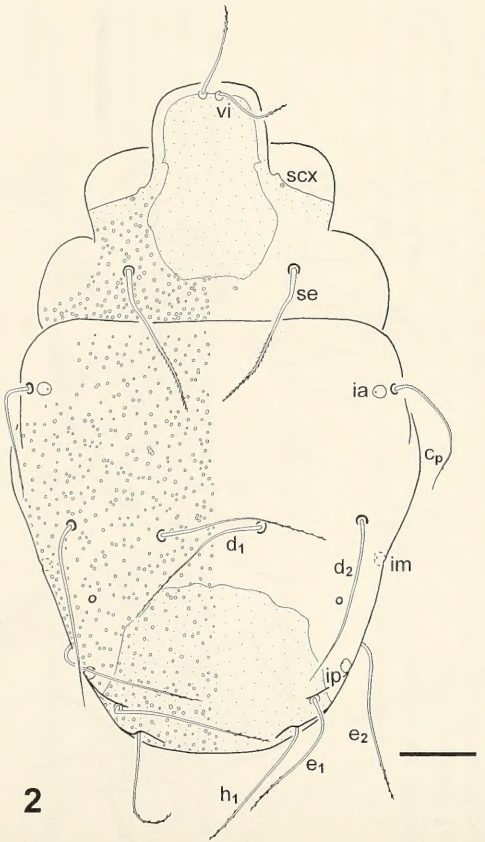
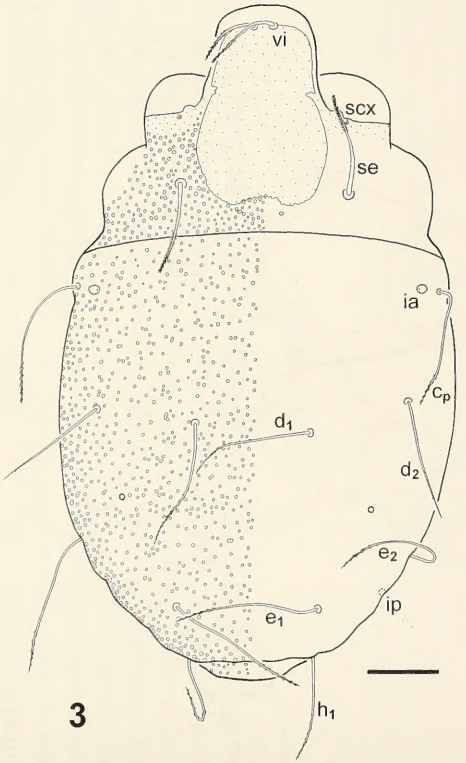
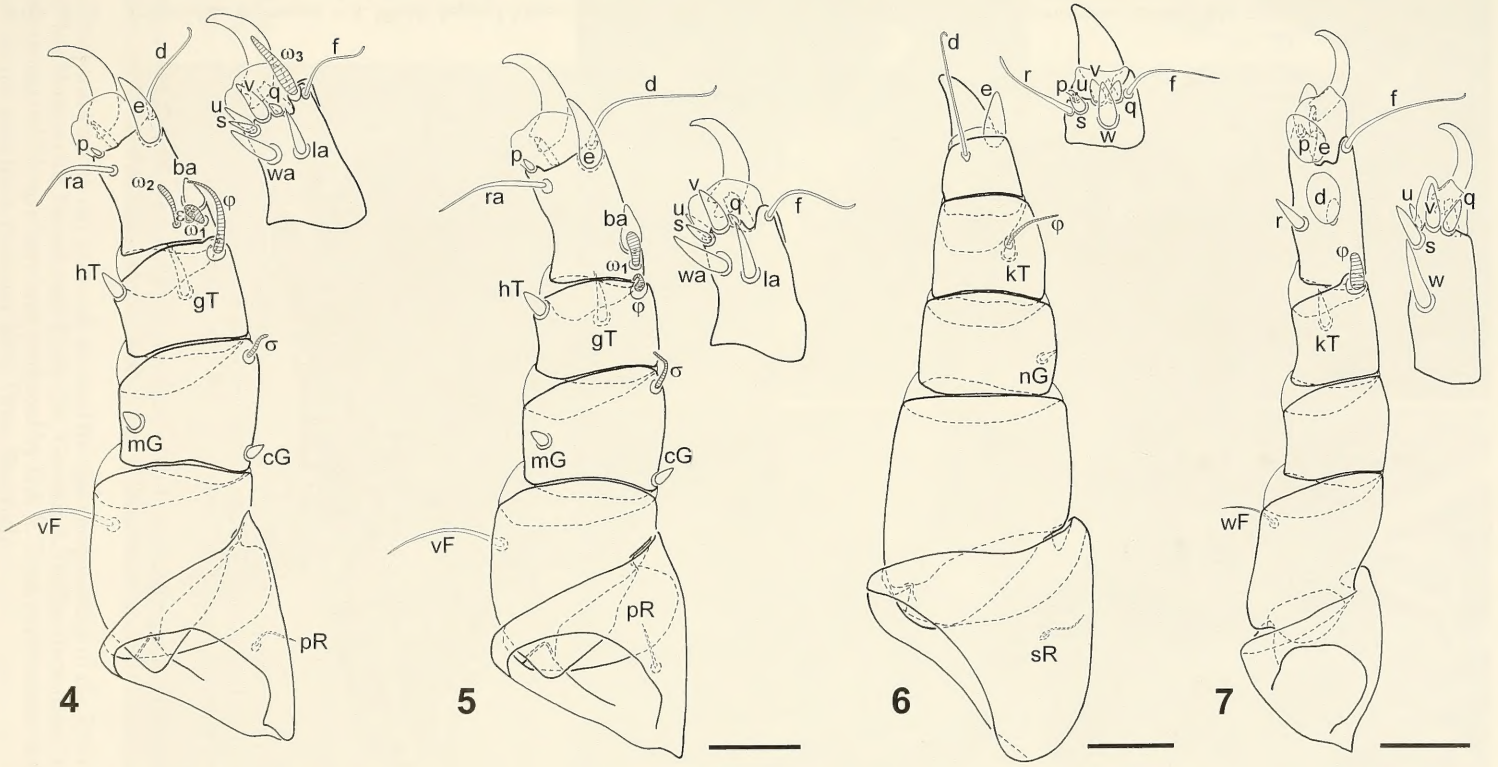


Fig. 1. *Schwiebea koerneri,* strong-legged heteromorphic male; ventral view, left legs partly omitted, cuticular pits of left body half omitted. – Scale bar: 40 µm.

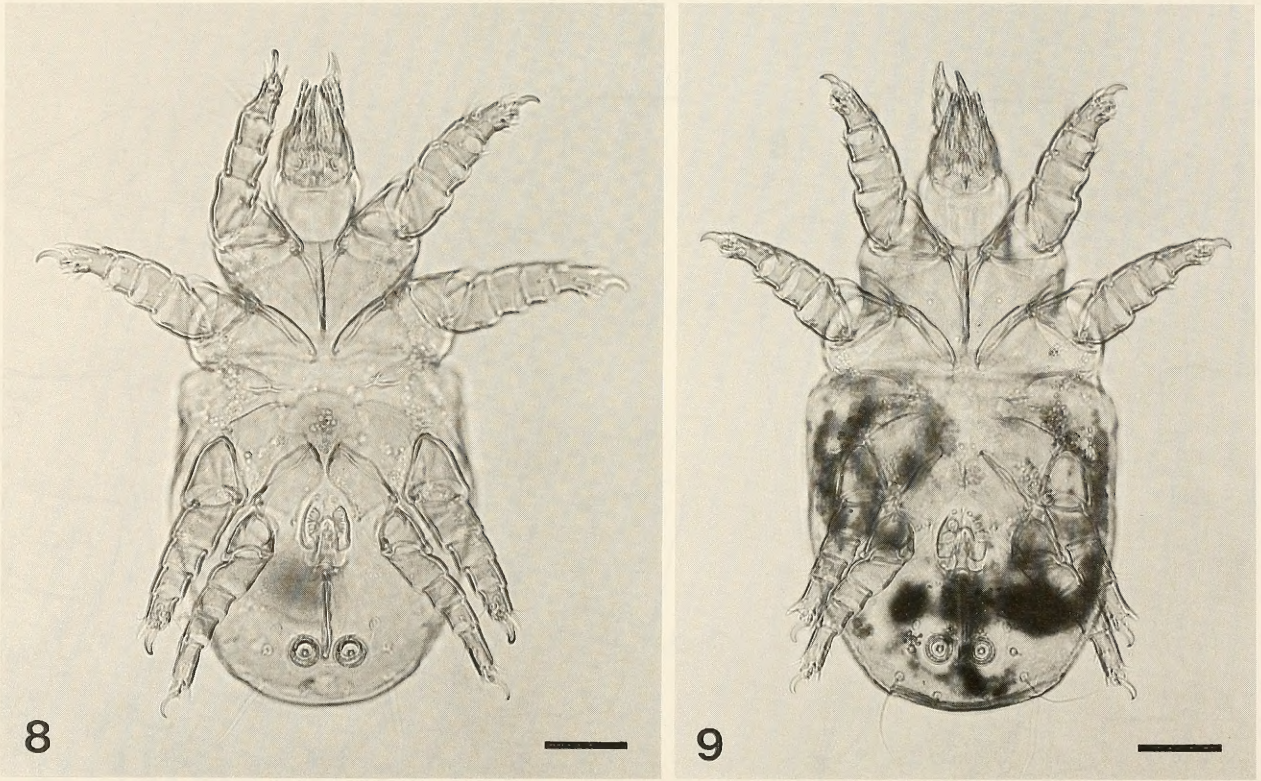




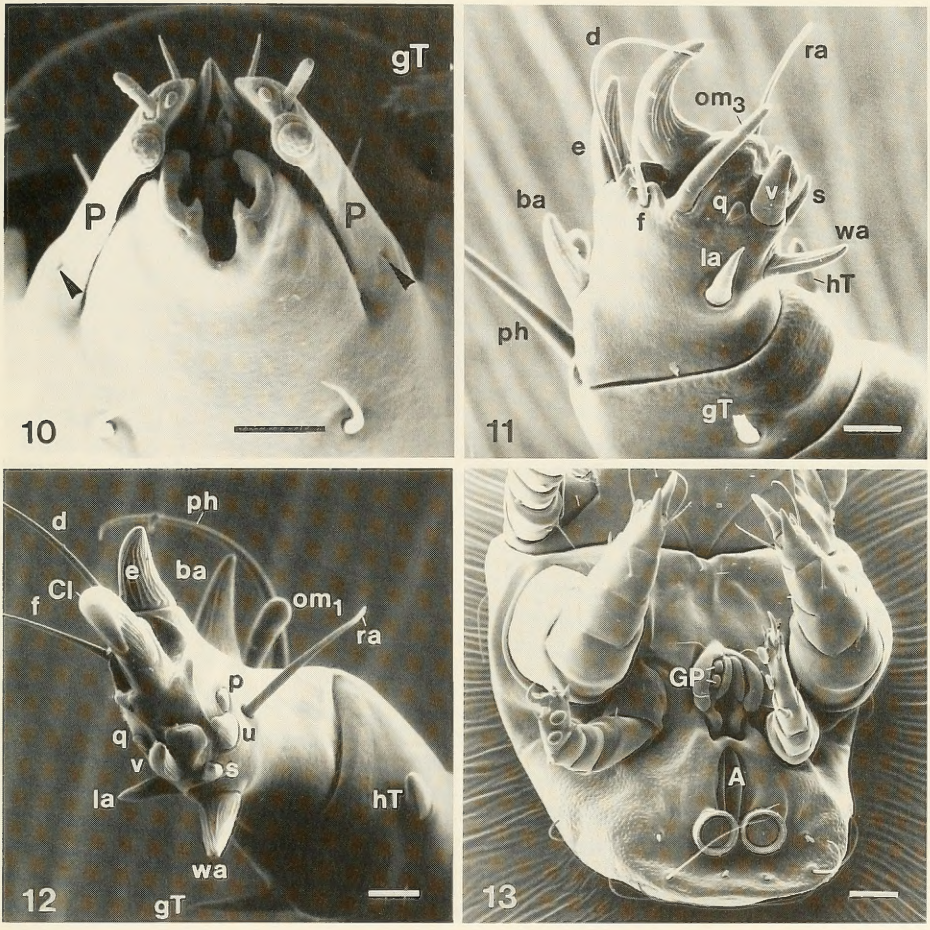
Figs. 2–3. *Schwiebea koerneri.* – 2. Strong-legged heteromorphic male; idiosoma, dorsal view (scale bar: 40 µm); – 3. female; idiosoma, dorsal view (scale bar: 40 µm). – Cuticular pits of right body half omitted.



Figs. 4–7. *Schwiebea koerneri*, strong-legged heteromorphic male. – 4. Leg I; – 5. leg II (scale bar Figs. 4 and 5: 20 µm); – 6. leg III (scale bar: 25 µm); – 7. leg IV (scale bar: 20 µm). – Legs are shown in dorsal view. In addition, the insert shows the tarsus from the opposite side.



Figs. 8–9. *Schwiebea koerneri.* – 8. Weak-legged heteromorphic male (light micrograph). – 9. Homeomorphic male (light micrograph); parts of the hysterosoma appear dark because of guanine deposition in the body cells. – Scale bar Figs. 8–9: 40 µm.

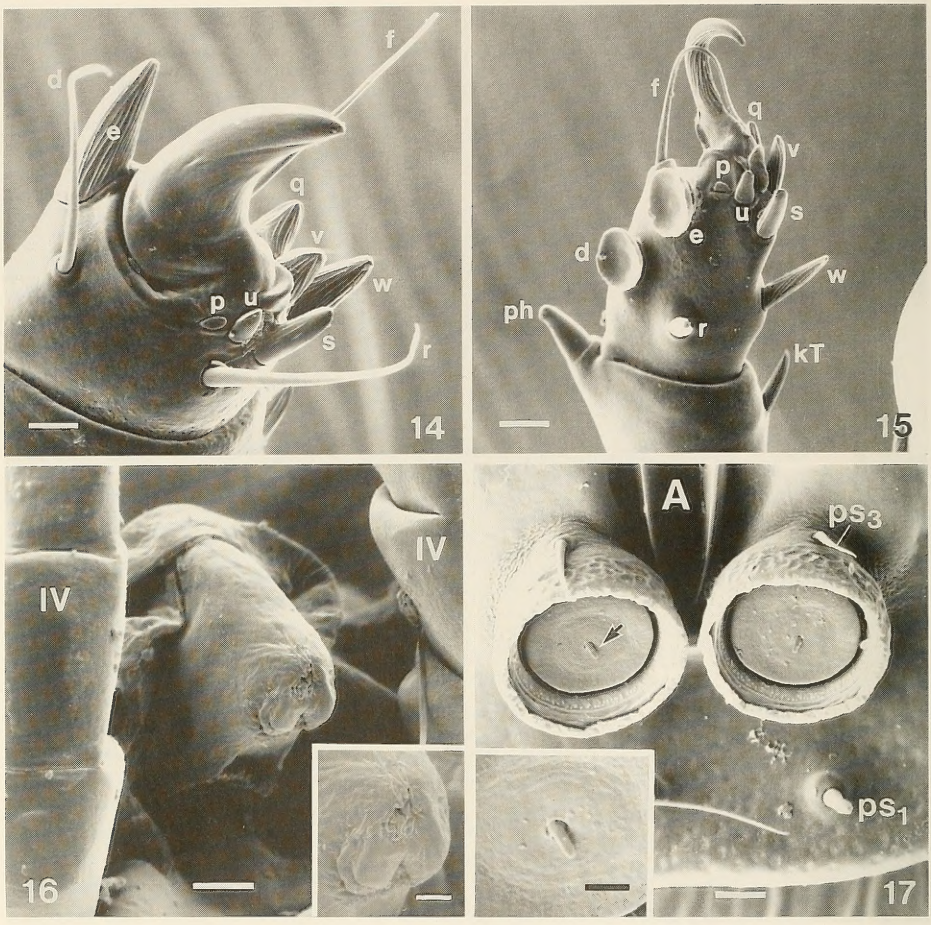


Figs. 10–13. *Schwiebea koerneri,* heteromorphic male. – 10. Gnathosoma, rostral part, ventral view; the *arrowheads* point at the sockets of the palpal seta v. Further *explications*: *P* = palp, *gT* = seta gT of left leg I (note its fringed tip) (scale bar: 5 µm); – 11. left leg I, medial view; om_3 = solenidion omega 3, *ph* = solenidion phi of tibia, *ba, d, e, f, gT, hT, la, q, ra, s, v, wa*: setae (scale bar: 5 µm); – 12. left leg II, frontal view; *Cl* = claw, om_1 = solenidion omega 1, *ph* = solenidion phi of tibia, *ba, d, e, f, gT, hT, la, p, q, ra, s, v, u, wa*: setae (scale bar: 5 µm); – 13. hysterosoma, ventral view, showing the beginning protrusion of aedeagus which made the genital papillae (*GP*) visible; further *explication*: *A* = anus (scale bar: 20 µm).

20. 04. 96. Rangendingen (near Hechingen), location "Postenbühl" Forest; under bark on wet resin; – 05. 03. 99. Entringen (near Tübingen); in tree-trunk, in abandoned nest of *Lasius fuliginosus*; – 27. 09. 97. Neubrandenburg, forest near Lake Tollense; on decaying wood.

Austria – 26. 02. 98. Vienna, Wienerwald between Leopoldsberg and Kahlenberg (Josefinenhütte); in tree-trunk, in abandoned nest of *Lasius fuliginosus.*

For comparisons with our materials we used the slide preparations of the Türk collection (Staatliches Museum für Naturkunde Karlsruhe, Germany). Further documents (notes, additional drawings) which may have been produced by F. & E. Türk in the course of their investigations do not exist (pers. commun. by F. Türk, Bayreuth).



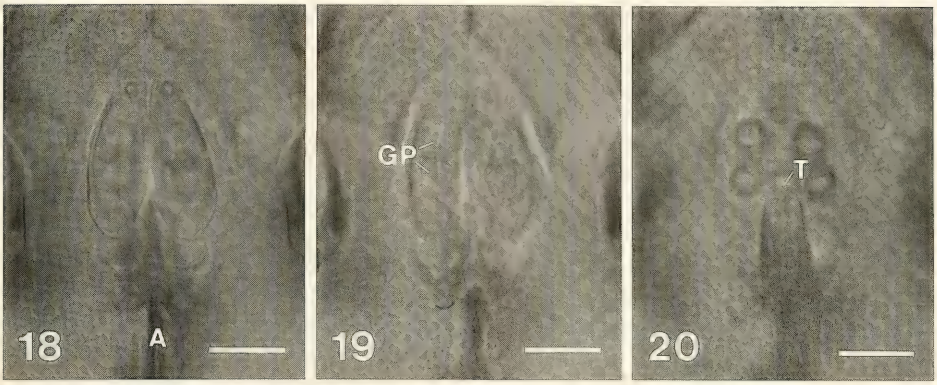
Figs. 14–17. *Schwiebea koerneri,* strong-legged heteromorphic male. – 14. Right leg III, medial view; *d, e, f, p, q, r, s, v, w*: setae (scale bar: 5 µm); – 15. right leg IV, medial view; *ph* = solenidion phi of tibia, *d, e, f, kT, p, q, r, s, v, w*: setae (scale bar: 5 µm); – 16. protruded aedeagus, frontal view (scale bar: 5 µm); inset: tip of aedeagus, *IV* = leg IV (scale bar inset: 2 µm); – 17. adanal copulatory suckers (detail of Fig. 13) (scale bar: 5 µm); *arrow*, inset: central seta of sucker, *A* = anus, ps_1, ps_3: setae (scale bar inset: 2 µm).

2.2. Methods

The plant material was observed by means of a stereo microscope (magnifications 16× and 40×), removing the bark carefully from the branches and drawing apart leaves and the rotten wood.

From all localities, maximally 50 speciments of each species were prepared for light microscopy in order to estimate the local morphological variability within the respective population. To examine which instars belong to the same species we separated and prepared for the light microscope mites in moulting torpor just before hatching. Eggs in different phases of development (after formation of the prelarva and after formation of the larva, but before hatching) were equally dealt with.

For light microscopy, the mites were mounted in Hoyer's fluid. Drawings were made with



Figs. 18–20. *Schwiebea koerneri,* strong-legged heteromorphic male; optical sections (light micrographs) of different focal planes taken through genital region. – 18. Superficial plane; *A* = anus; – 19. middle plane; *GP* = genital papillae; – 20. deepest plane; *T* = tip of aedeagus. – Scale bar Figs. 18–20: 25 µm.

a Zeiss drawing apparatus. Light micrographs were done by using the Zeiss photomicroscope "Axiophot".

For scanning electron microscope (SEM) investigations the mites were killed by freezing and were washed with a tenside. Further preparation was performed after Bock (1987) in five steps: 1) fixation by a modified Carnoy (acetic acid: chloroforme: ethanol = 1 : 1: 3) for at least 4 hrs, 2) ethanol (5–10 min), 3) hexamethyldisilazane (5 min), 4) air-drying, 5) sputtering with gold. The mites were examined by using the SEM DSM 940 (Zeiss).

Our species concept follows the "biological species concept" sensu Mayr (1963). The nomenclature of idiosomal chaetotaxy follows Griffiths et alii (1990), the nomenclature of leg chaetotaxy is according to Griffiths (1964) and Fain (1967), and the nomenclature of gnathosomal setae follows Atyeo & Braasch (1966).

2.3. Acknowledgements

This project was financially supported by the Deutsche Forschungsgemeinschaft (grant No. FR 276/12–2).

For their most generous help we thank the following persons: Prof. Dr. L. Beck (Karlsruhe) made available the relevant slide preparations of the Türk collection; Dr. F. Türk (Bayreuth) gave us additional informations on his work; J. Spelda (Stuttgart) determined the species identity of the one centipede; B. Curth (Stuttgart) assisted in the SEM preparations and Dr. W. Jansen (Stuttgart) critically read the manuscript and gave valuable comments.

3. *Schwiebea koerneri* Türk & Türk, 1957

3.1. General Aspects

The original description of *S. koerneri* by Türk & Türk (1957) is based on two specimens of the deutonymph. These two deutonymphs were attached to an ant (*Lasius brunneus,* Hymenoptera: Formicidae). The description by Türk & Türk is accompanied by two drawings showing the dorsal and ventral aspect. On the dorsal side, the deutonymph shows only two pairs of setae. But in the text Türk & Türk admit that surely there must be present more setae, but that they could recognize only two pairs.

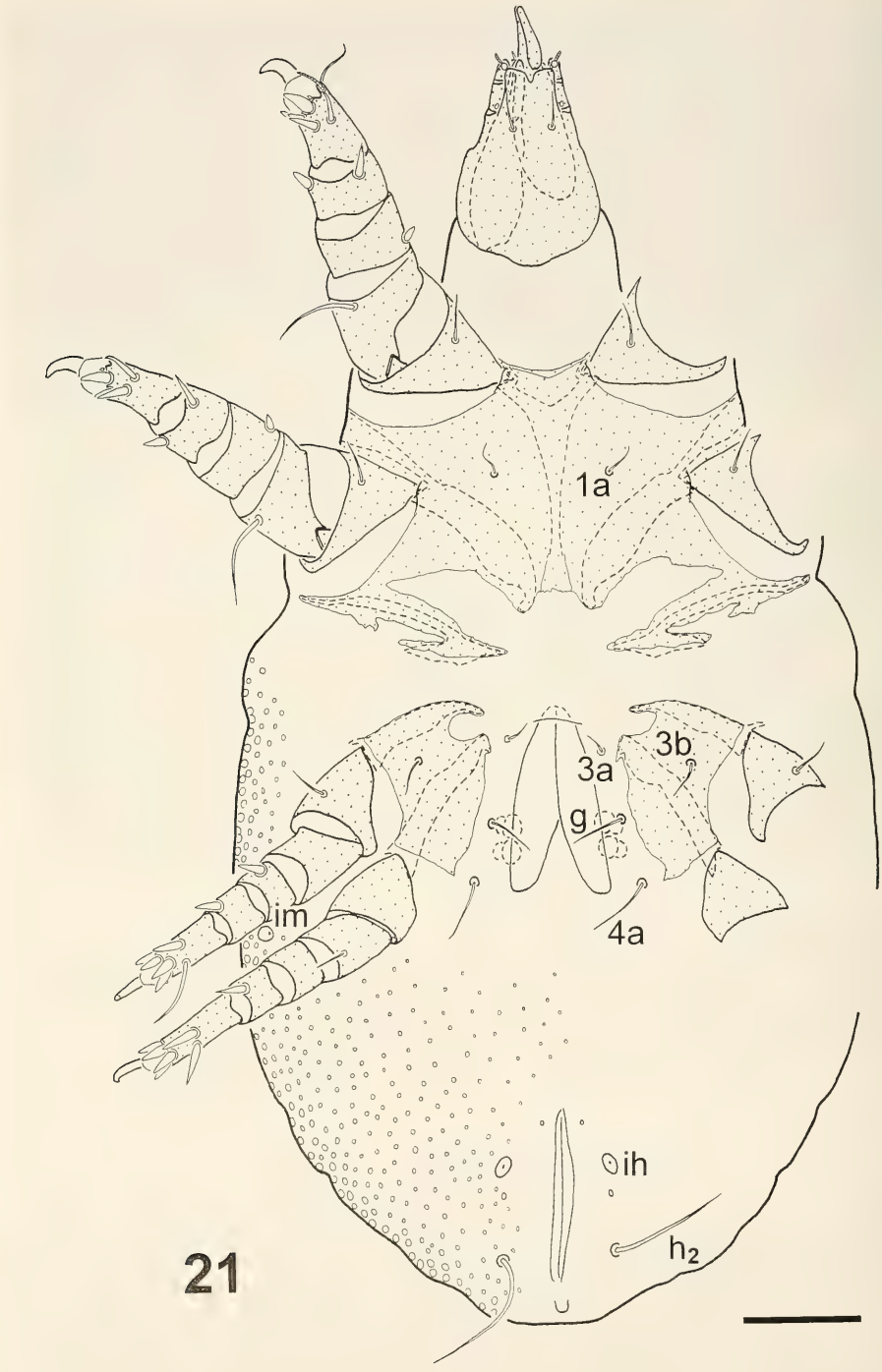
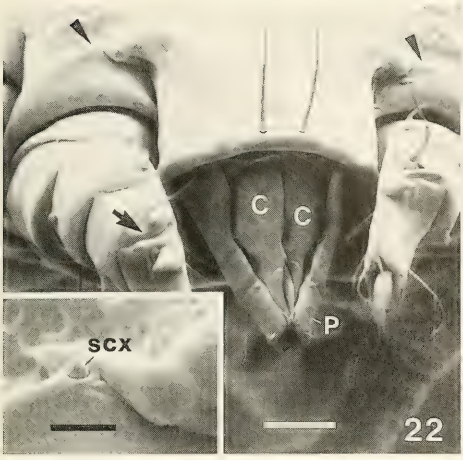
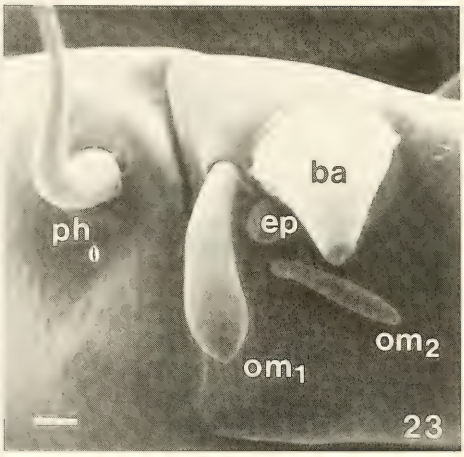


Fig. 21. *Schwiebea koerneri*, female; ventral view, left legs partly omitted, cuticular pits of left body half omitted. – Scale bar: 40 µm.





Figs. 22–23. *Schwiebea koerneri,* female. – 22. Rostral end, frontal view (scale bar: 20 µm); *arrowhead,* inset: supracoxal seta (*scx*) (scale bar inset: 5 µm), *arrow*: complex of solenidia of tarsus (detail also shown in Fig. 23), *C* = chelicera, *P* = palp; – 23. complex of solenidia on tarsus of right leg I (detail of mite shown in Fig. 22, *arrow*); further *explications*: *ba*: seta, *ep* = famulus epsilon, om_1 = solenidion omega 1, om_2 = solenidion omega 2, *ph* = solenidion phi of tibia (scale bar: 2 µm).

In the Türk collection one slide preparation of a deutonymph of *S. koerneri* exists. The slide is only labelled with the species name and bears no further informations. The specimen is well preserved and allows unequivocally the identification of that species.

3.2. Redescription of *Schwiebea koerneri* Türk & Türk, 1957

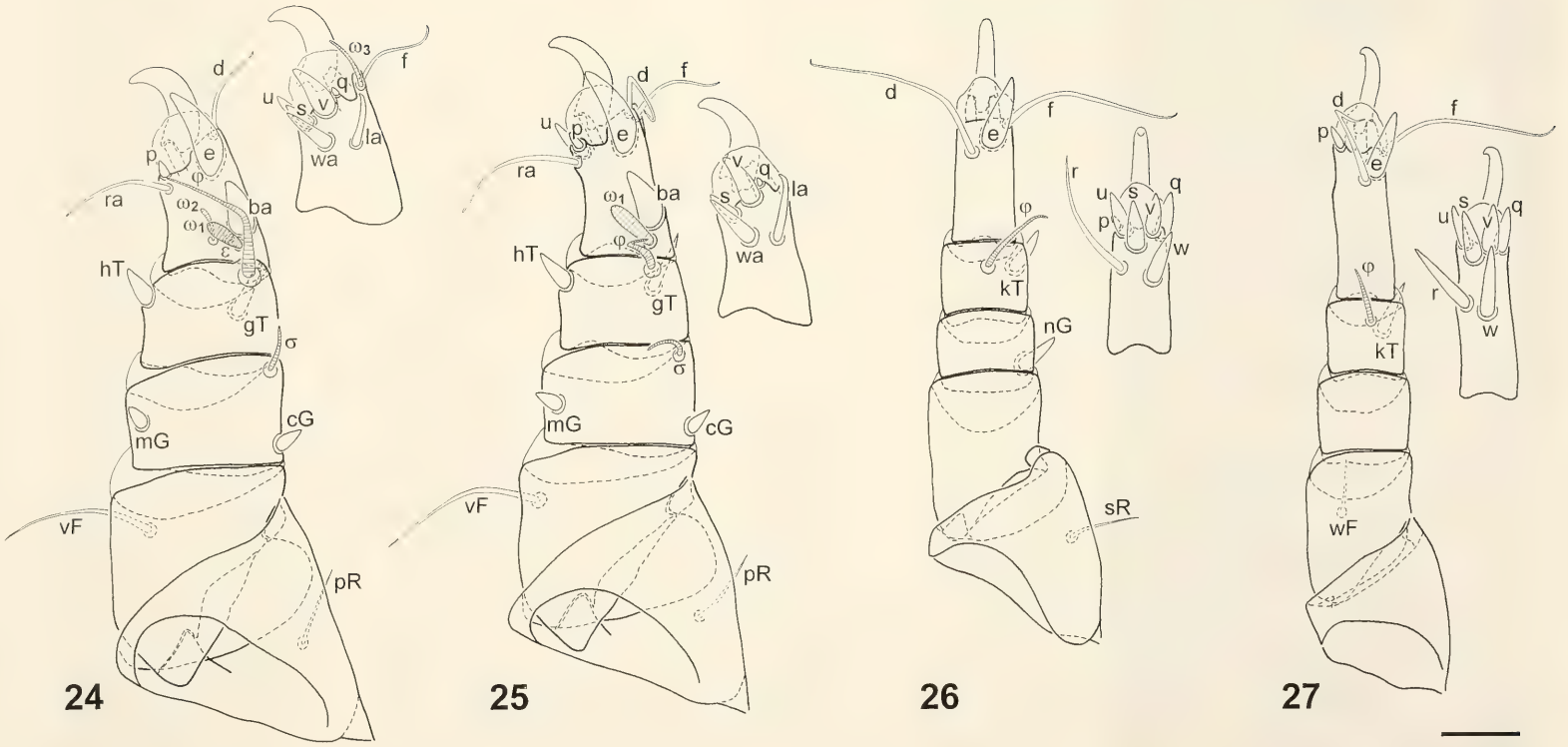
Schwiebea koerneri Türk & Türk (1957): Systematik und Ökologie der Tyroglyphiden Mitteleuropas. – *In:* Stammer, H.-J. (ed.): Beiträge zur Systematik und Ökologie mitteleuropäischer Acarina. – Vol. 1 Tyroglyphidae und Tarsonemini: 139 [surroundings of Erlangen, Germany].

Propodosomatal shield in all non-hypopial instars without or with only minor indentation at posterior margin; in all non-hypopial instars seta v of palp is reduced (only the socket is present) (Fig. 10); all instars with only one solenidion on genu I; gT of leg I in all non-hypopial instars fringed (Fig. 10).

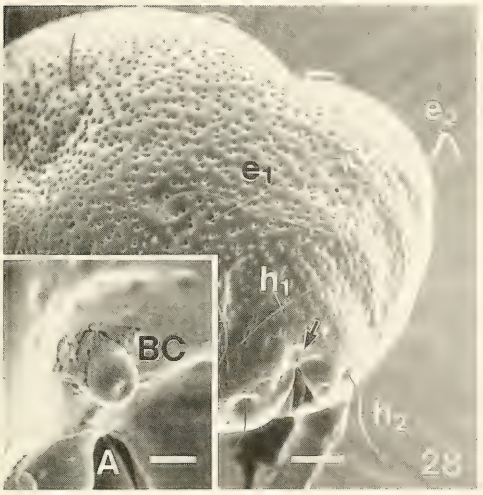
3.2.1. Adults

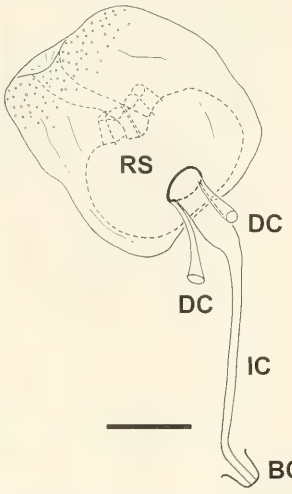
3.2.1.1. Male (heteromorphic)

The heteromorphic male is the dominant male type in all populations investigated by us. The heteromorphic males differ only in their size and shape of leg III from the homeomorphic males. Their body size shows a considerable variability (length of idiosoma between 255 µm and 380 µm). Legs III also show a variability with respect to the "thickness" of the podomeres in relation to the respective podomeres of leg IV and with respect to the proportions of their structural elements (setae, claw etc.). Figs. 1, 6, 13 and 14 illustrate one extreme of this variability (here called



Figs. 24–27. *Schwiebea koerneri*, female. – 24. Leg I; – 25. leg II; – 26. leg III; – 27. leg IV. – Legs are shown in dorsal view. In addition, the insert shows the tarsus from the opposite side. – Scale bar: 15 µm.





Figs. 28–29. *Schwiebea koerneri*, female. – 28. Opisthosoma, dorsal view, showing the position of the bursa copulatrix (*arrow*) (scale bar: 20 µm); further *explications*: inset: bursa copulatrix (*BC*) (scale bar: 2.5 µm), *A* = anus, e_1, e_2, h_1, h_2: setae; – 29. receptaculum seminis and appendages (scale bar: 10 µm); *BC* = bursa copulatrix, *DC* = ductus conjunctivus, *IC* = inseminatory canal, *RS* = sac of receptaculum seminis.

"strong-legged heteromorphic male"), Figs. 8 and 58 the other extreme (here called "weak-legged heteromorphic male"); colour: beige.

Dorsum (Fig. 2): Idiosomal chaetome: scx, vi, se, c_p, d_1, d_2, e_1, e_2, h_1, ia, im, ip. – Entire surface covered with small roundish pits except in the region of the propodosomatal shield; with opisthosomatal shield between the openings of the oil glands and ip, encompassing the sockets of e_1 and h_1. Setae vi, se, c_p, d_1, e_1, e_2, h_1 pectinate, the number of pectinations shows considerable variability, for example from about ten pectinations to one pectination in seta c_p.

Ventrum (Fig. 1): Idiosomal chaetome: 1a, 3a, 3b, 4a, g, h_2, ps_1, ps_2, ps_3, ih. – The entire ventrum of propodosoma is covered by a continuous shield; on each side a sclerotized band runs along the border between proterosoma and hysterosoma, each band is connected with the ventral shield of the propodosoma by a narrow bridge-like sclerotization; metapodosoma covered by a continuous shield encompassing the sockets of setae 3b and 4a but not 3a and g; hysterosoma behind this shield covered with small roundish pits. – Genital opening covered by two folds (Figs. 13, 18, 19); aedeagus strongly sclerotized and with a blunt tip (Figs. 16, 20); one pair of adanal copulatory suckers; a short seta originates in the center of each sucker (Figs. 13, 17). End of opisthosoma posterior to the adanal suckers and to ps_2 sclerotized. – ps_3 short and fine, ps_1 and ps_2 short spines; all setae smooth.

Legs (Figs. 4–7, 11–15, 58): Chaetome see Table 1; ω_1 gradually tapering towards its base.

3.2.1.2. Male (homeomorphic)

Length of idiosoma approximately 250 µm, colour: beige.

The homeomorphic males (Fig. 9) differ from the heteromorphic males only in

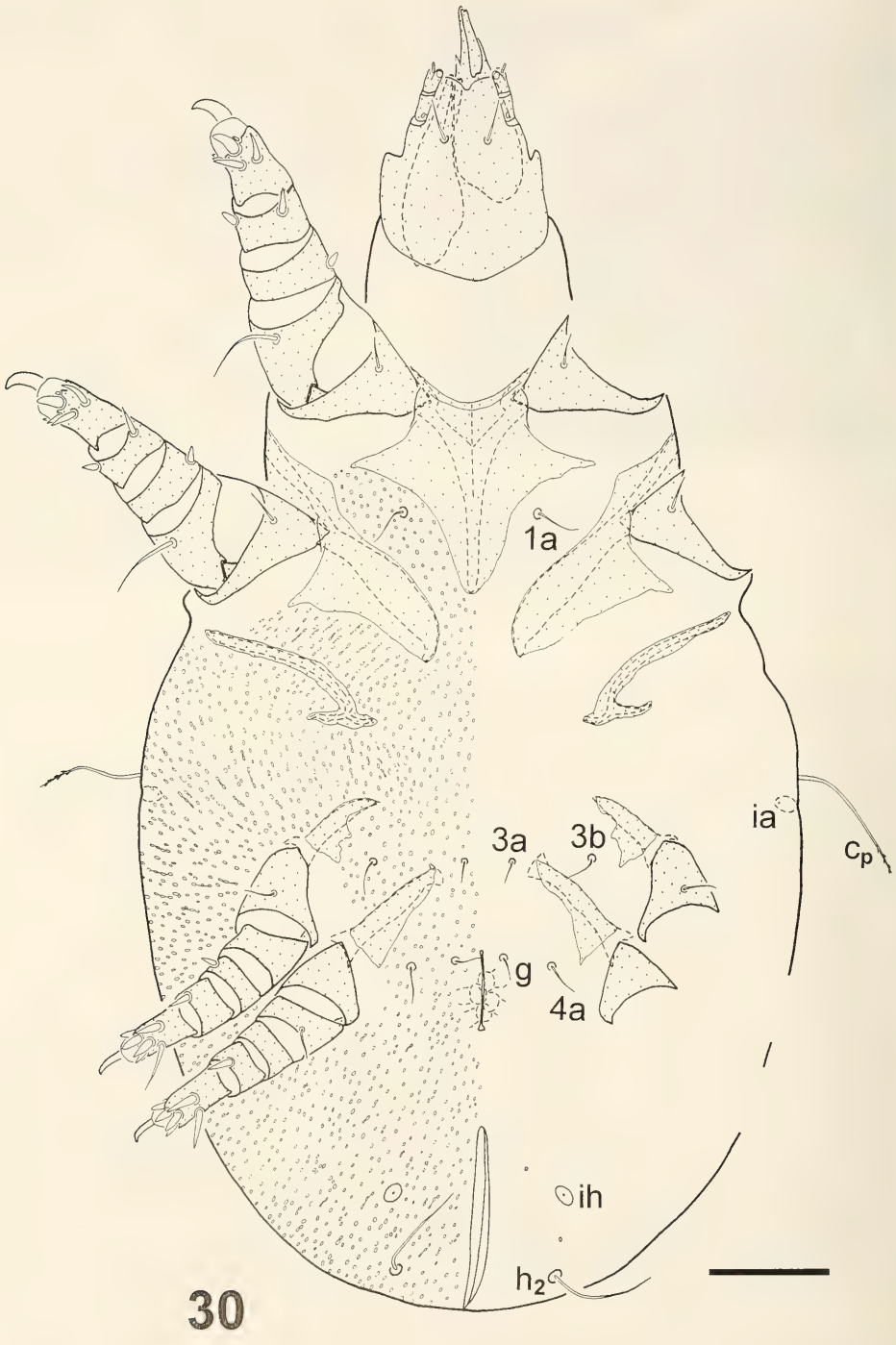
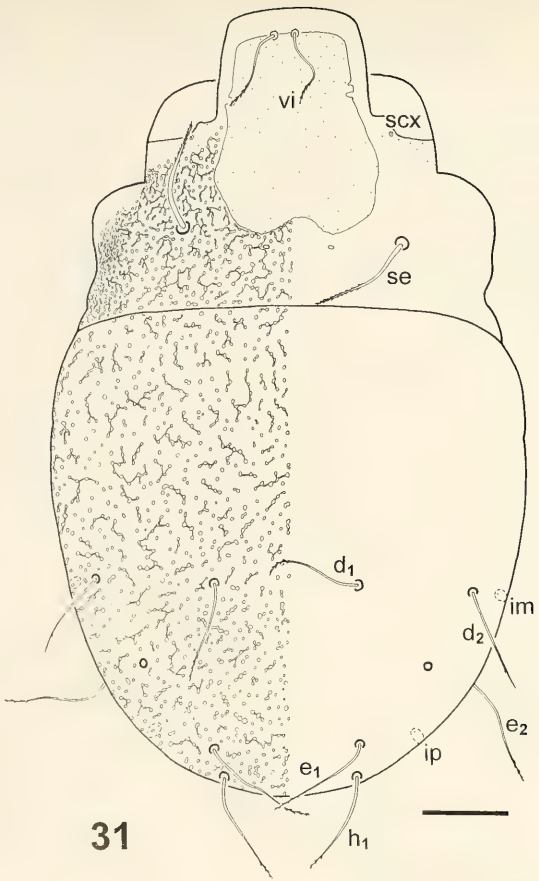
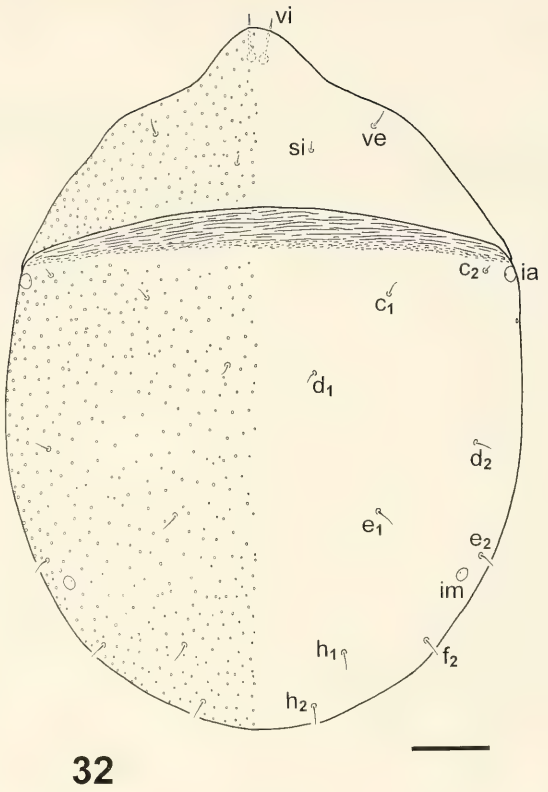
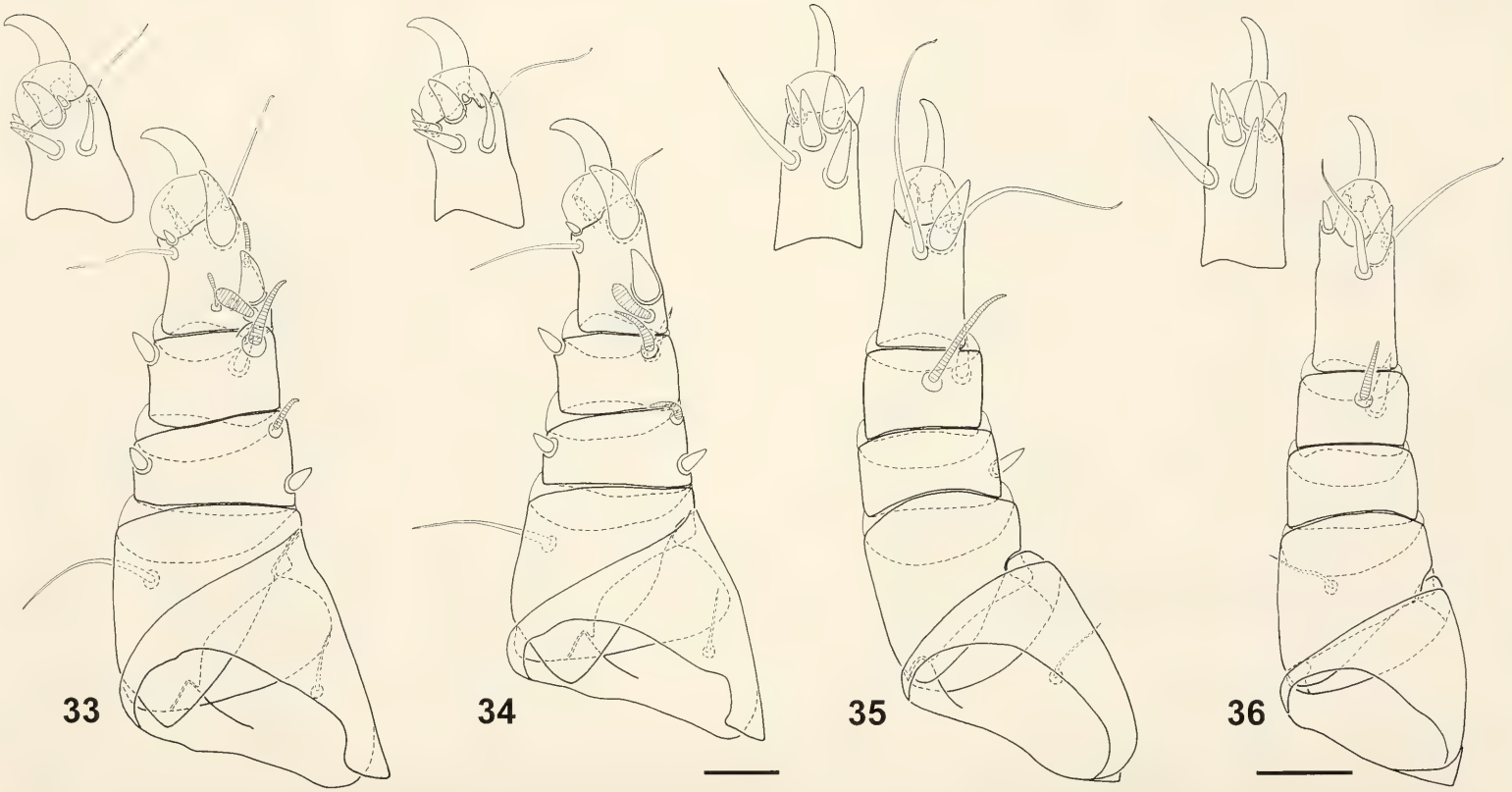


Fig. 30. *Schwiebea koerneri*, tritonymph; ventral view, lef legs partly omitted, cuticular pits of left body half omitted. – Scale bar: 30 µm.





Figs. 31–32. *Schwiebea koerneri.* – 31. Tritonymph; idiosoma, dorsal view (scale bar: 30 µm); – 32. deutonymph; idiosoma, dorsal view (scale bar: 20 µm). – Cuticular pits of right body half omitted.



Figs. 33–36. *Schwiebea koerneri*, tritonymph. – 33. Leg I; – 34. leg II (scale bar Figs. 33 and 34: 10 µm); – 35. leg III; – 36. leg IV (scale bar Figs. 35 and 36: 10 µm). – Legs are shown in dorsal view. In addition, the inset shows the tarsus from the opposite side.

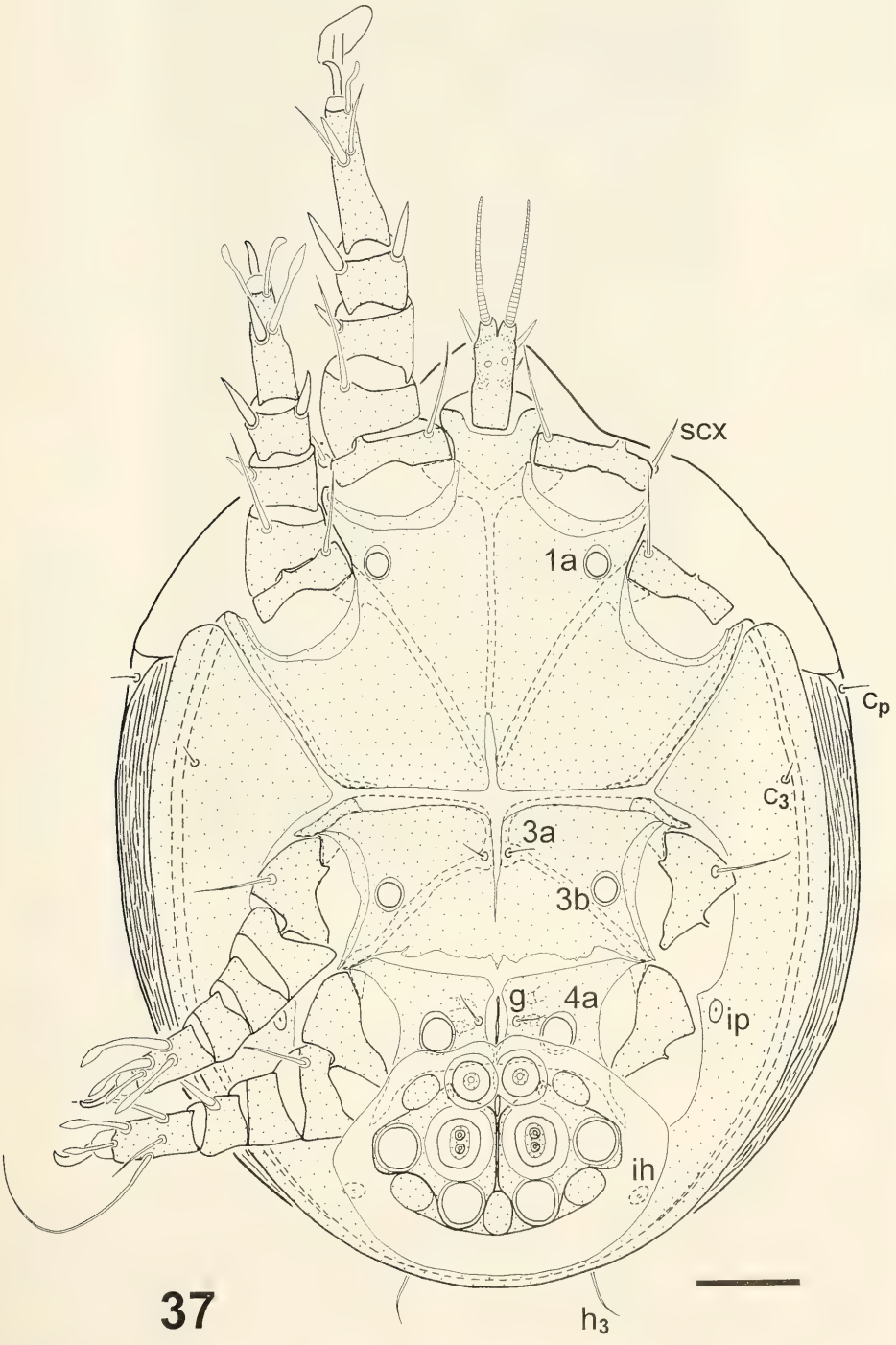


Fig. 37. *Schwiebea koerneri,* deutonymph; ventral view, left legs partly omitted. – Scale bar: 20 µm.

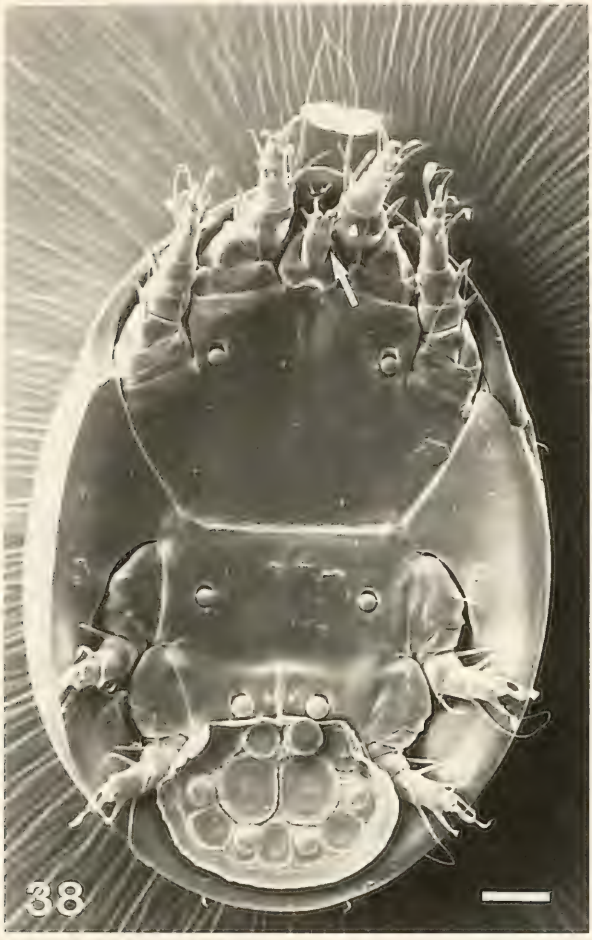


Fig. 38. *Schwiebea koerneri,* deutonymph; ventral view; *arrow*: palposoma (scale bar: 20 µm).

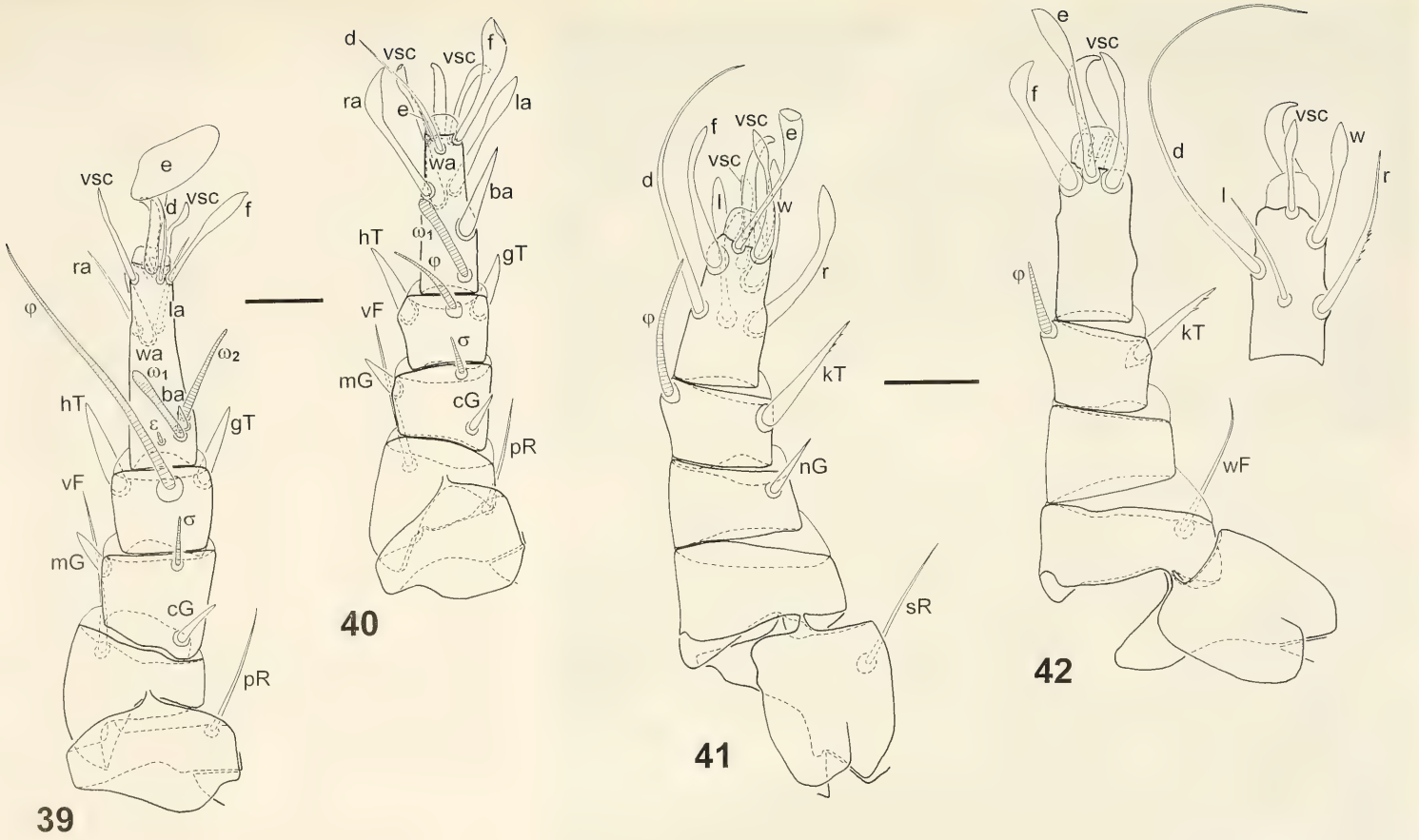
their body size (which is always within the size range of the smallest heteromorphic males) and in the shape of leg III which is identical to the shape of the female leg III (see Fig. 26).

3.2.1.3. Female

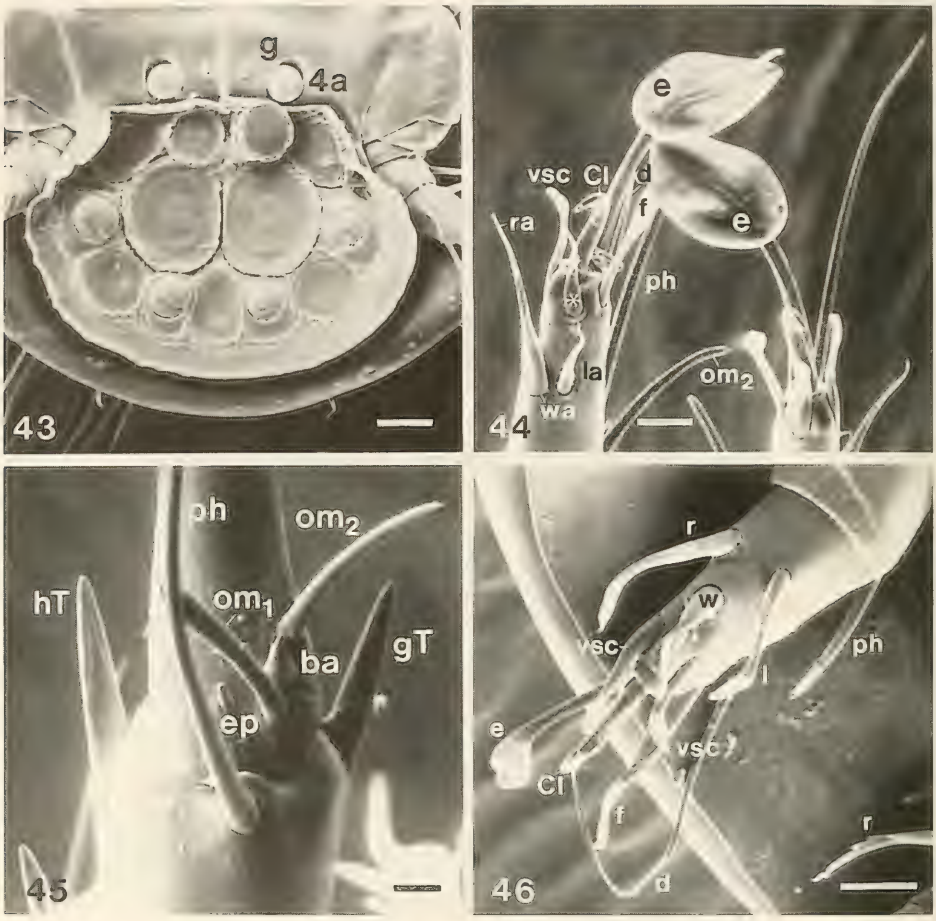
Length of idiosoma between 310 µm and 400 µm, colour: beige.

Dorsum (Figs. 3, 22): Idiosomal chaetome: scx, vi, se, c_p, d_1, d_2, e_1, e_2, h_1, ia, ip. – Entire surface covered with small roundish pits except in the region of the propodosomatal shield. Setae vi, se, c_p, d_1, d_2, e_1, e_2, h_1 pectinate (with variability in the number of pectinations as given for the male); d_2 with maximally one pectination.

Ventrum (Fig. 21): Idiosomal chaetome: 1a, 3a, 3b, 4a, g, h_2, im, ih. – Ventrum of propodosoma covered by a continuous shield; on each side a sclerotized band runs along the border between proterosoma and hysterosoma, each band is connected



Figs. 39–42. *Schwiebea koerneri,* deutonymph. – 39. Leg I; – 40. leg II (scale bar Figs. 39 and 40: 10 µm); – 41. leg III; – 42. leg IV (scale bar Figs. 41 and 42: 10 µm). – Legs are shown in dorsal view. The insert for Fig. 42 shows the tarsus from the opposite side.



Figs. 43–46. *Schwiebea koerneri,* deutonymph. – 43. The so-called sucker plate at the end of opisthosoma: *g, 4a*: setae (scale bar: 10 µm); – 44. tarsi of leg I showing the adhesive setae (*e*); further *explications*: *asterisk*: seta vsc, *Cl* = claw, om_2 = solenidion omega 2, *ph* = solenidion phi of tibia, *d, f, la, ra, vsc, wa*: *setae* (scale bar: 5 µm); – 45. detail of leg I showing the complex of solenidia on tarsus; *ba*: seta, *ep* = famulus epsilon, om_1 = solenidion omega 1, om_2 = solenidion omega 2, *ph* = solenidion phi of tibia, *gT, hT*: setae of tibia (scale bar: 2.5 µm); – 46. tibia and tarsus of leg III: *Cl* = claw, *ph* = solenidion phi of tibia, *d, e, f, l, r, vsc, w*: setae (scale bar: 5 µm).

with the ventral shield of the propodosoma; coxal fields of leg III and IV are sclerotized and fused forming a continuous shield that flanks the oviporus; in some individuals a small elongation of that shield reaches the socket of 4a; surface of opisthosoma covered with small roundish pits. – Oviporus covered by two folds forming a triangle; bursa copulatrix immediately behind the anal slit (Fig. 28); for receptaculum seminis and appendages see Fig. 29. – All setae smooth.

Legs (Figs. 23–27): Chaetome see Table 1; ω_1 gradually tapering towards its base (Fig. 23).

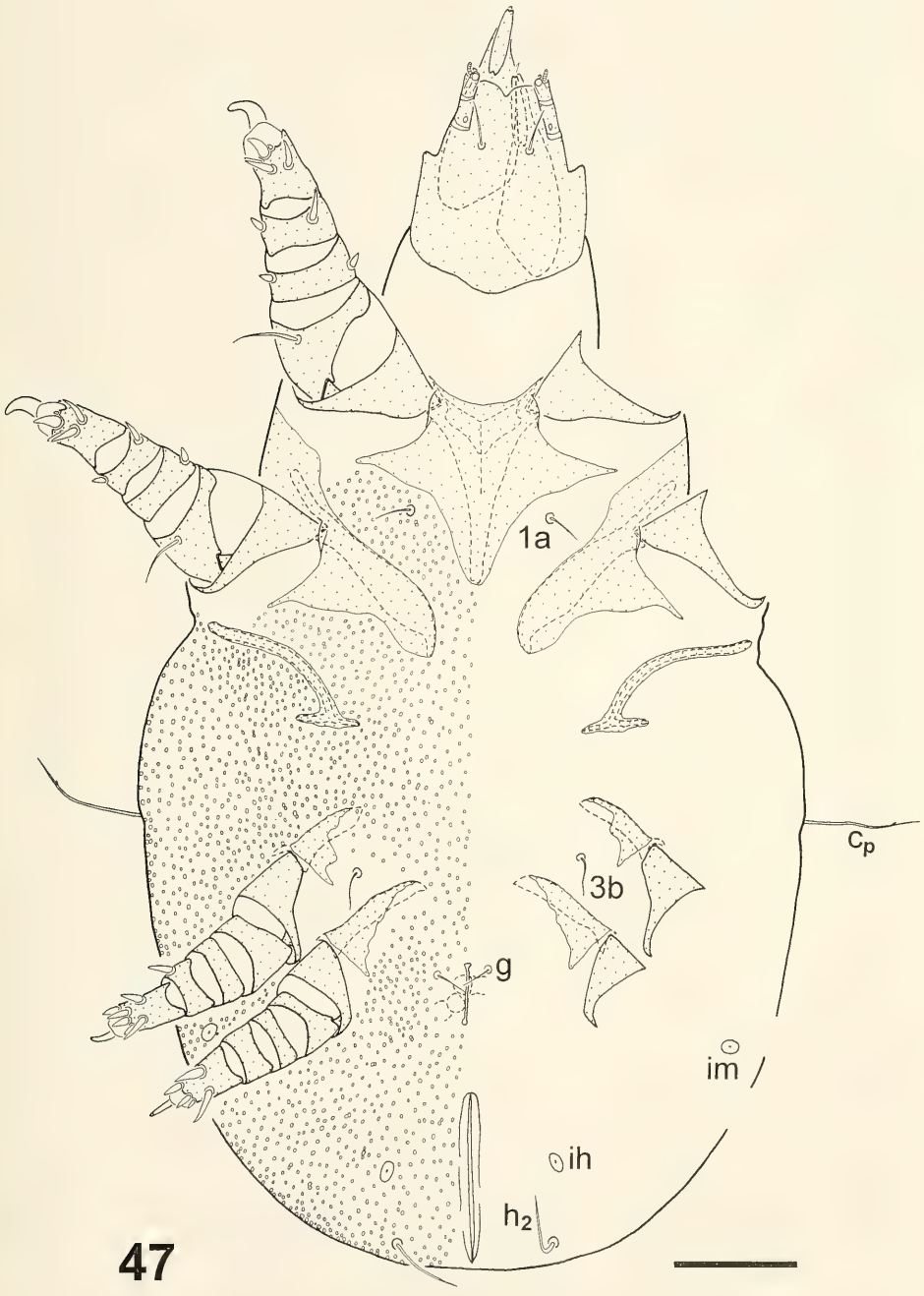
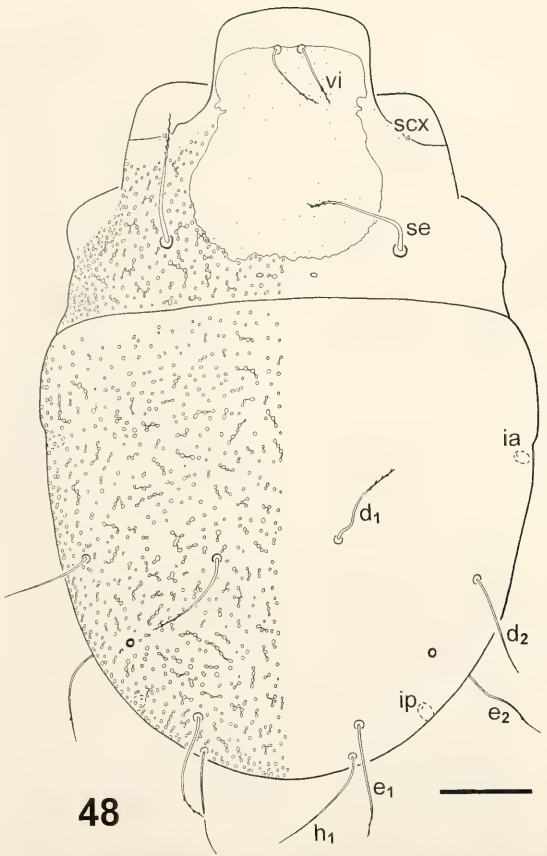
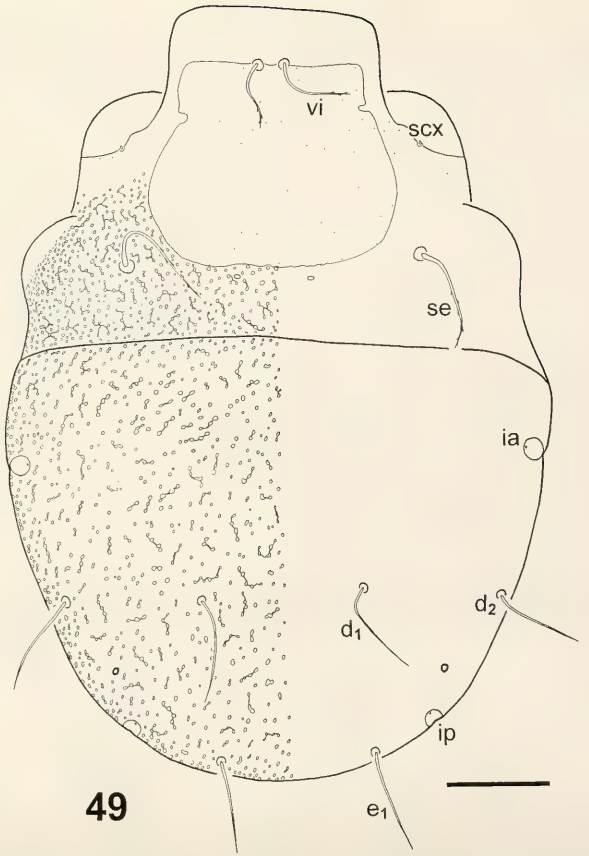
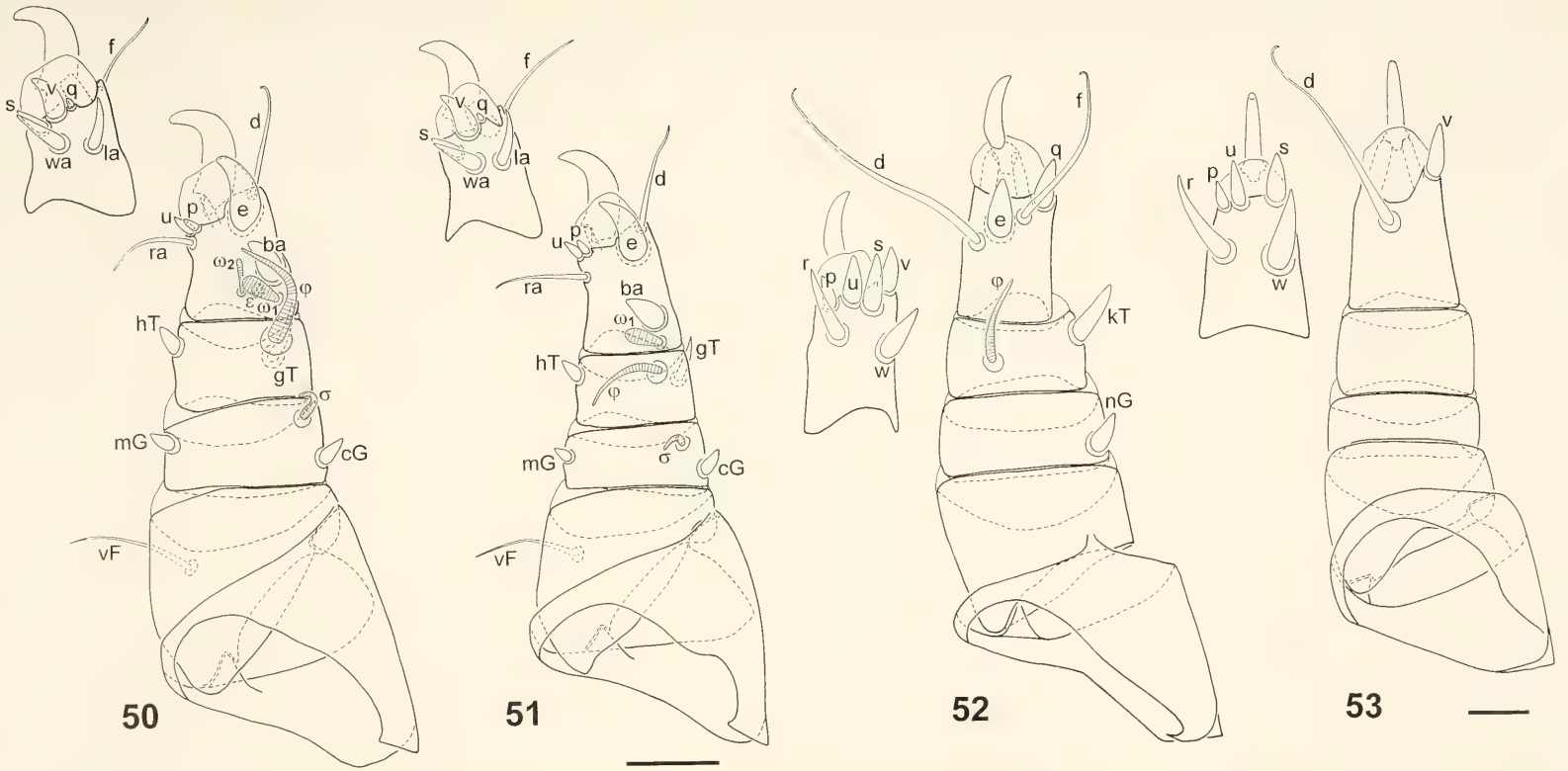


Fig. 47. *Schwiebea koerneri*, protonymph; ventral view, left legs partly omitted, cuticular pits of left body half omitted. – Scale bar: 25 µm.





Figs. 48–49. *Schwiebea koerneri.* – 48. Protonymph; idiosoma, dorsal view (scale bar: 25 µm); – 3. larva; idiosoma, dorsal view (scale bar: 20 µm). – Cuticular pits of right body half omitted.



Figs. 50–53. *Schwiebea koerneri*, protonymph. – 50. Leg I; – 51. leg II (scale bar Figs. 50 and 51: 10 µm); – 52. leg III; – 53. leg IV (scale bar Figs. 52 and 53: 5 µm). – Legs are shown in dorsal view. In addition, the insert shows the tarsus from the opposite side.

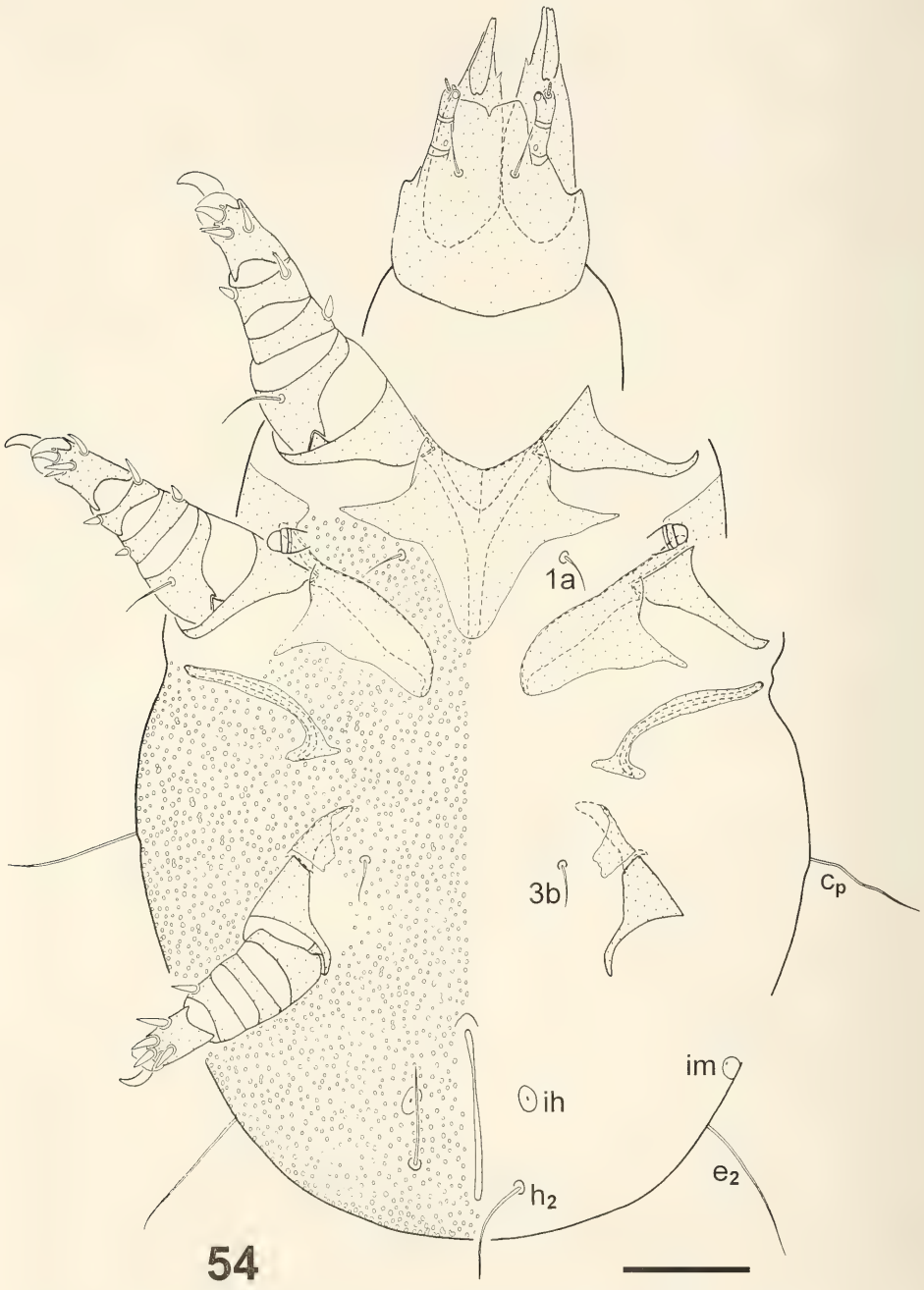
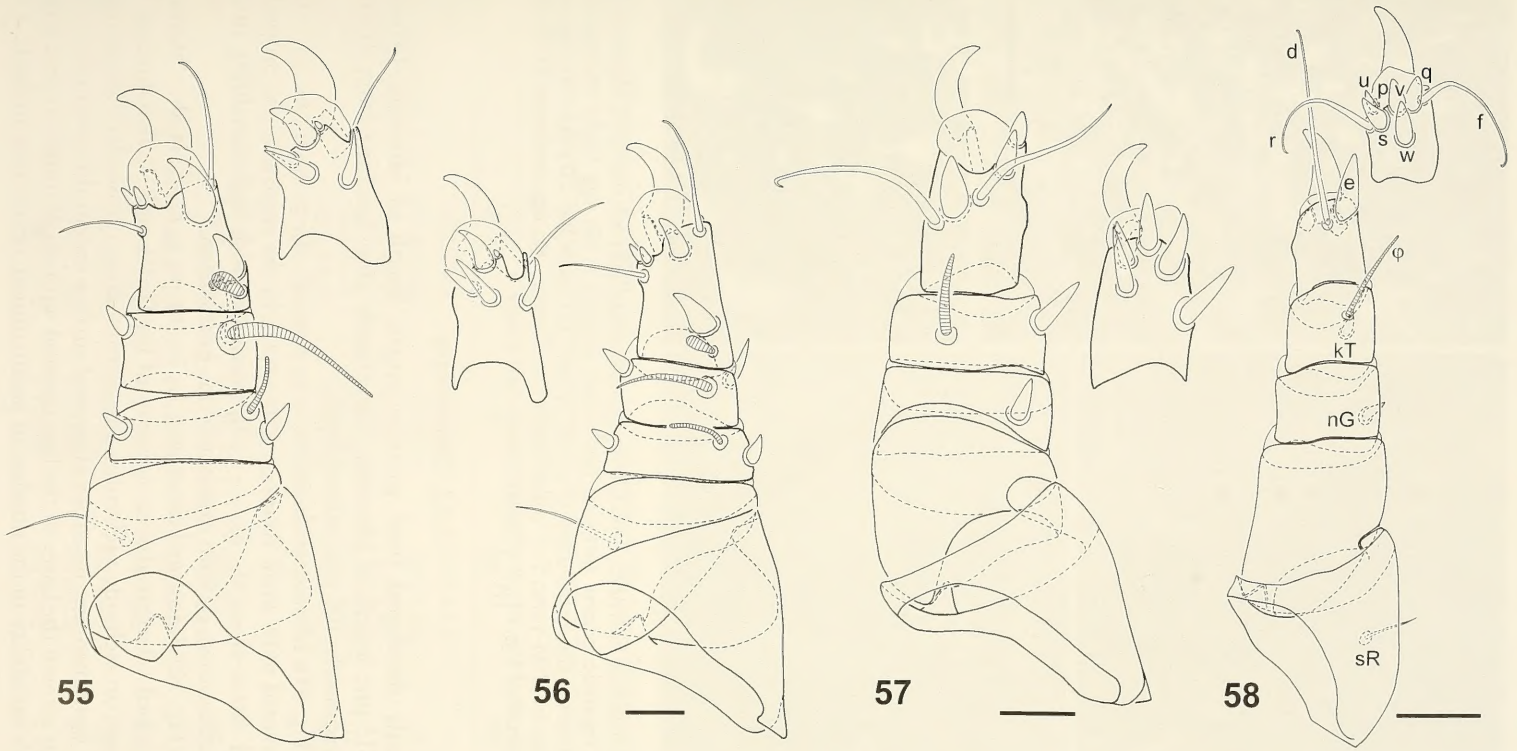
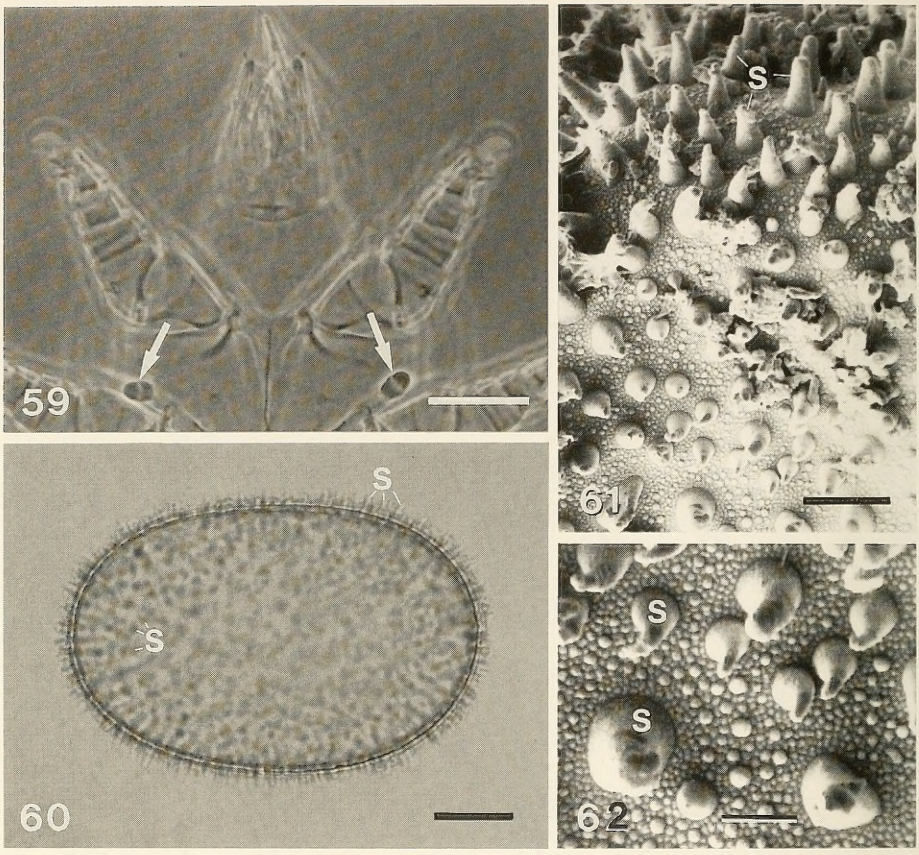


Fig. 54. *Schwiebea koerneri*, larva; ventral view, left legs partly omitted, cuticular pits of left body half omitted. – Scale bar: 20 µm.



Figs. 55–58. *Schwiebea koerneri.* – 55. Larva, leg I; – 56. larva, leg II (scale bar Figs. 55 and 56: 5 µm); – 57. larva, leg III (scale bar: 5 µm); – 58. weak-legged heteromorphic male, right leg III of male shown in Fig. 8 (scale bar: 15 µm). – Legs are shown in dorsal view. In addition, the insert shows the tarsus from the opposite side.



Figs. 59–62. *Schwiebea koerneri.* – 59. Larva, proterosoma (light micrograph), showing the Claparède organs (*arrows*) (scale bar: 20 µm); – 60. egg (light micrograph) showing the distribution of small "spikes" (*S*) (scale bar: 20 µm); – 61. egg surface in SEM-view; *S* = "spike" (scale bar: 5 µm); – 62. egg surface in SEM-view (detail of Fig. 61); *S* = "spike" (scale bar: 2 µm).

3.2.2. Tritonymph

When directly developed from protonymph, length of idiosoma between 250 µm and 315 µm; length of idiosoma immediately after hatching from deutonymph approximately 190 µm; colour: white.

Dorsum (Fig. 31): Idiosomal chaetome: scx, vi, se, d_1, d_2, e_1, e_2, h_1, im, ip. – Entire surface covered with small roundish pits except in the region of the propodosomatal shield. Setae vi, se, d_1, d_2, e_1, e_2, h_1 pectinate (with high variability in the number of pectinations), d_2 with maximally one pectination.

Ventrum (Fig. 30): Idiosomal chaetome: 1a, 3a, 3b, 4a, g, h_2, c_p, ia, ih. – Sternum covered by a lobed sclerotized area; epimera of leg II, III and IV also covered by sclerotized areas; on each side a sclerotized band runs along the border between proterosoma and hysterosoma; the entire idiosomal surface except the sclerotized areas and the regions around the bases of the legs covered with small roundish pits; seta c_p pectinate (with variability in the number of pectinations), other setae smooth.

Legs (Figs. 33–36): Chaetome see Table 1.

3.2.3. Deutonymph

Length of idiosoma between 180 µm and 220 µm, colour: beige.

Dorsum (Fig. 32): Idiosomal chaetome: ve, si, c_1, c_2, d_1, d_2, e_1, e_2, f_2, h_1, h_2, ia, im. – Surface covered with small roundish pits; all setae short and smooth.

Ventrum (Figs. 37–38): Idiosomal chaetome: scx, vi, 1a, c_3, c_p, 3a, 3b, 4a, g, h_3, ip, ih. – Epimeres and epimerites of leg II orientated approximately parallel to each other; coxal fields I and II sclerotized forming a continuous shield; its posterior margin runs rectangular to the sternum but with a deep incision at the level of the sternum; coxal fields III sclerotized and fused but with deep incision at the anterior margin between setae 3a; its posterior margin shaped irregularly; coxal fields IV sclerotized flanking the genital opening; anterior margin of coxal fields IV smooth; at each side a large sclerotized area covers the region lateral the most anterior shield, the legs and the sucker plate. – Ratio of length of idiosoma and width of sucker plate (Fig. 43) about 4 : 1. – Setae 1a, 3b, 4a shaped as conoids, other setae smooth.

Legs (Figs. 39–42, 44–46): Chaetome see Table 1.

3.2.4. Protonymph

Length of idiosoma between 175 µm and 240 µm, colour: white.

Dorsum (Fig. 48): Idiosomal cheatome: scx, vi, se, d_1, d_2, e_1, e_2, h_1, ia, ip. – Setae vi, se, d_1 pectinate, other setae smooth. – Otherwise as given for tritonymph.

Ventrum (Fig. 47): Idiosomal chaetome: 1a, 3b, g, h_2, c_p, im, ih. – Seta c_p with maximally one pectination, other setae smooth. – Otherwise as given for tritonymph.

Legs (Figs. 50–53): Chaetome see Table 1.

Table 1. Chaetotactic formulae for setae and solenidia of the legs of *Schwiebea koerneri*.

Setae				
	leg I	leg II	leg III	leg IV
larva	12.2.2.1.0	12.2.2.1.0	10.1.1.0.0	–
protonymph	12.2.2.1.0	12.2.2.1.0	10.1.1.0.0	7.0.0.0.0
deutonymph	9.2.2.1.1	9.2.2.1.1	8.1.1.0.1	8.1.0.1.0
tritonymph	12.2.2.1.1	12.2.2.1.1	10.1.1.0.1	10.1.0.1.0
adults	12.2.2.1.1	12.2.2.1.1	10.1.1.0.1	10.1.0.1.0
Solenidia				
	leg I	leg II	leg III	leg IV
larva	1+ε.1.1.0.0	1.1.1.0.0	0.1.0.0.0	–
protonymph	2+ε.1.1.0.0	1.1.1.0.0	0.1.0.0.0	0.0.0.0.0
deutonymph	2+ε.1.1.0.0	1.1.1.0.0	0.1.0.0.0	0.1.0.0.0
tritonymph	3+ε.1.1.0.0	1.1.1.0.0	0.1.0.0.0	0.1.0.0.0
adults	3+ε.1.1.0.0	1.1.1.0.0	0.1.0.0.0	0.1.0.0.0

3.2.5. Larva and Egg

Length of idiosoma between 120 µm and 150 µm, colour: white.

Dorsum (Fig. 49): Idiosomal chaetome: scx, vi, se, d_1, d_2, e_1, ia, ip. – Setae vi and se pectinate, other setae smooth. – Otherwise as given for tritonymph.

Ventrum (Fig. 54): Idiosomal chaetome: 1a, 3b, e_2, h_2, c_p, im, ih. – All setae smooth. With short Claparède organs (Fig. 59). – Otherwise as given for tritonymph.

Legs (Figs. 55–57): Chaetome see Table 1.

Egg (Fig. 60): Length between 95 µm and 120 µm; colur: beige. – Surface of egg covered with small "spikes" (Figs. 61–62).

3.3. Habitats of *Schwiebea koerneri*

We found this species mostly in the deeper regions of wood. The mites often fed on the feces of other consumers of decaying wood (e.g. Julidae) and one can find them burrowing in the fecal pellets of these animals.

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